Santa Cruz and Los Angeles Predictive Policing 6 month Trial

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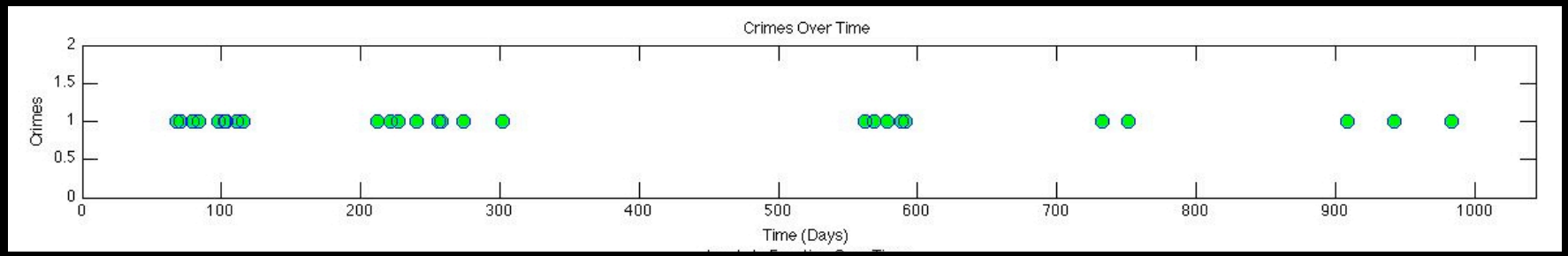
UC MaSC
Mathematical
And Simulation
Modeling of Crime

Crime Hotspots and Clustering



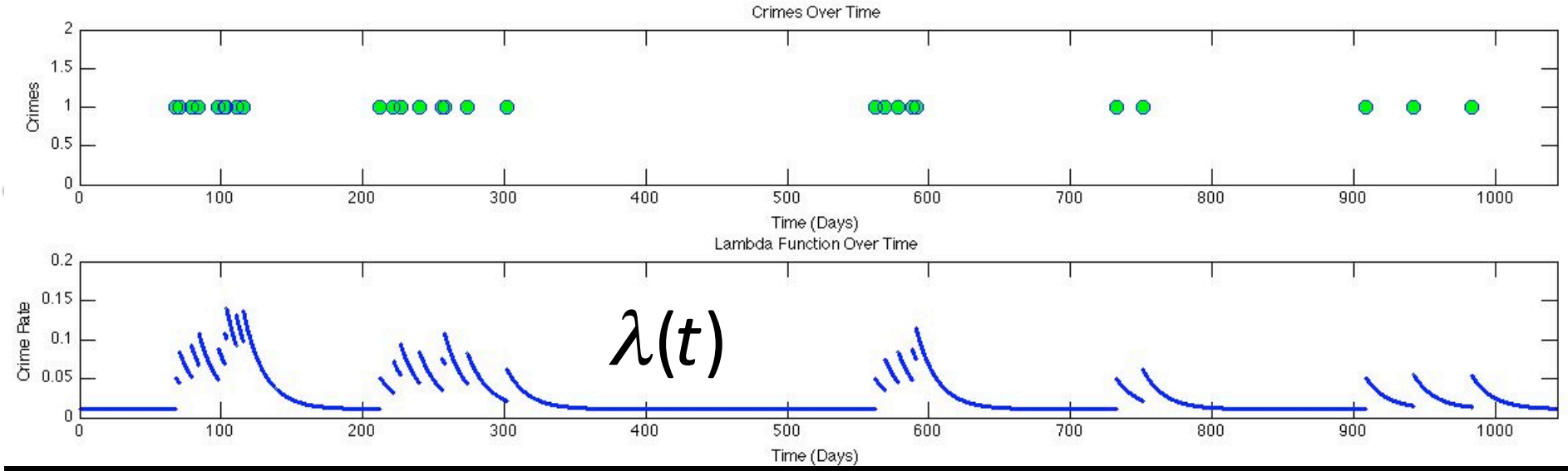
Locke-Lowell inter-gang violence 1999-2002 in Hollenbeck Los Angeles

- Certain crime types show an elevated risk of crime following an event

Behavioral basis for clustering

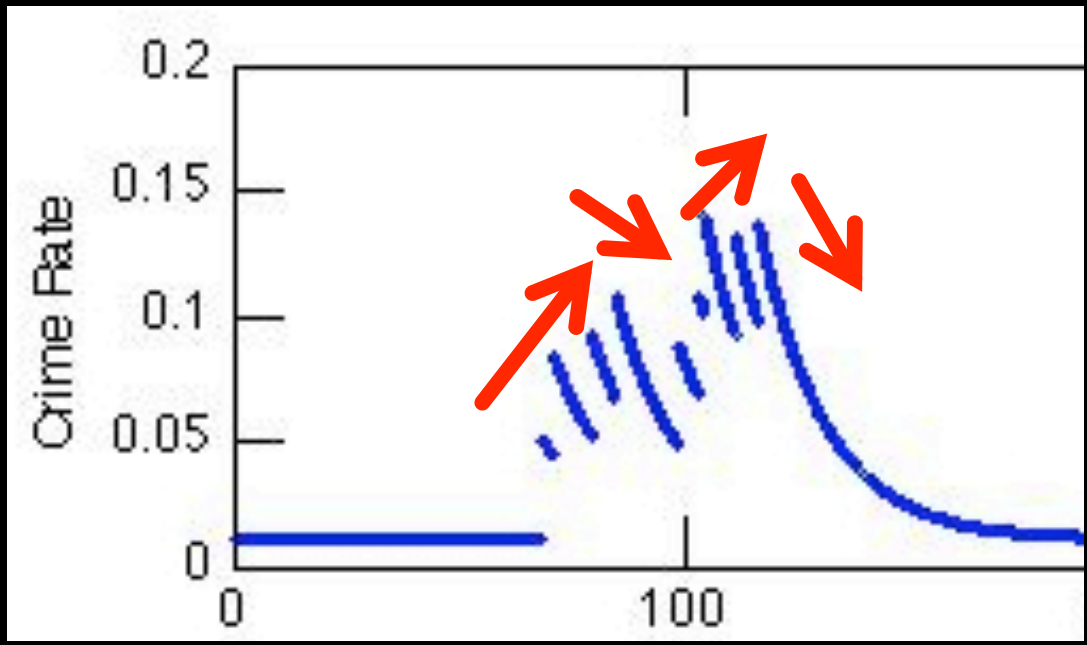
- Retaliation is a cause of inter-gang violence
- Burglars return to the same, or neighboring, house in the days/weeks after a crime

> "I always go back [to the same places] because, once you been there, you know just about when you been there before and when you can go back. An every time I hit a house, it's always on the same day [of the week] I done been before cause I know there ain't nobody there. " (Subject No. 51)
>
> Wright and Decker *Burglars on the Job*



$\lambda(t)$

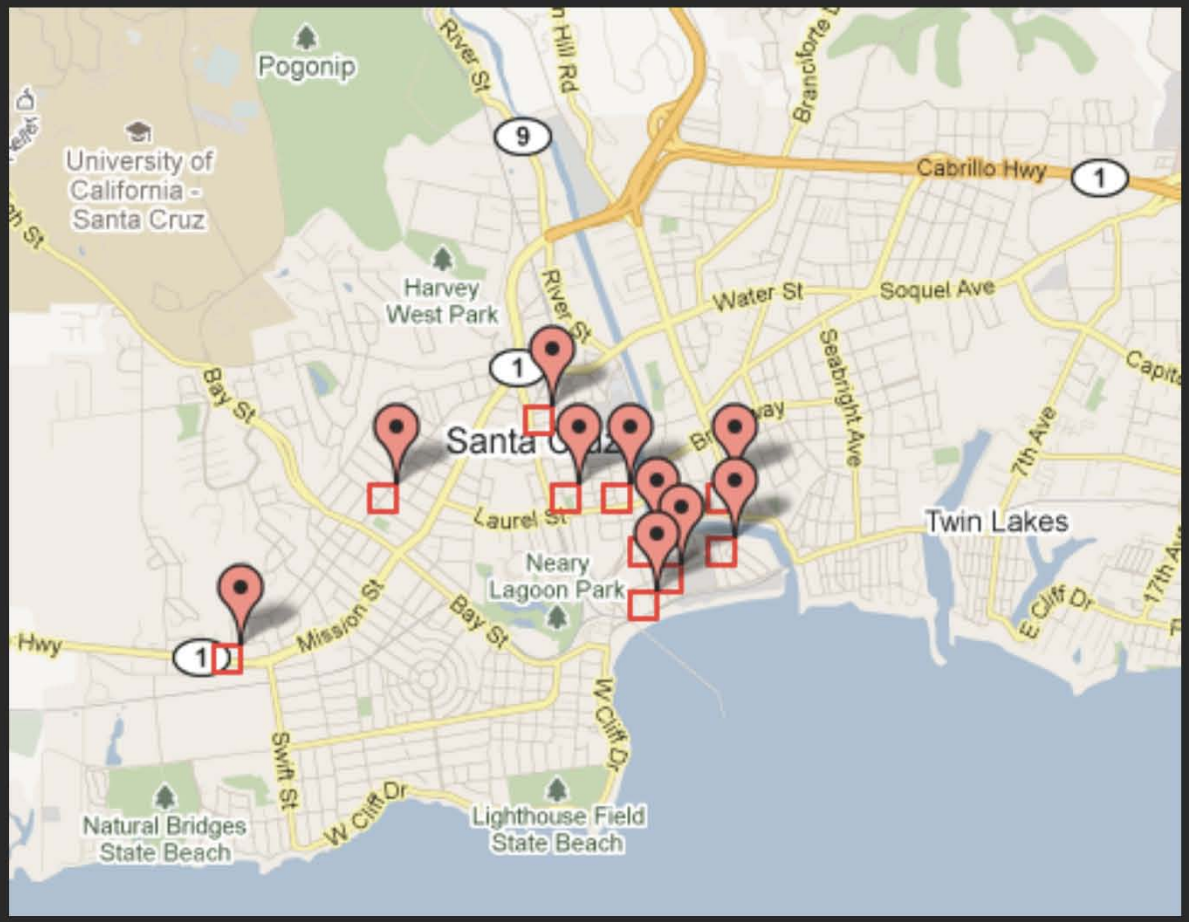
Hawkes Process model adapted from seismology



Forecasting and Directed Patrols

- Each day fit the Hawkes Process to past data to estimate risk level across the city
- Direct patrols to highest risk areas and times of day
- Next day recalibrate model and repeat
  - As highest risk areas change, the model and patrols adapt

Prototype Software w/ Google Maps Interface



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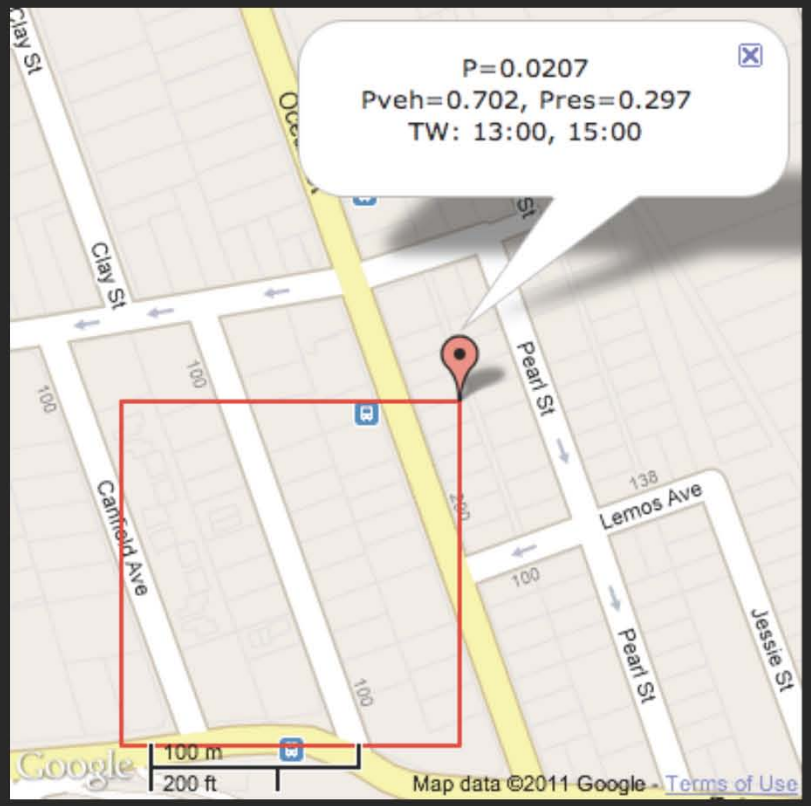
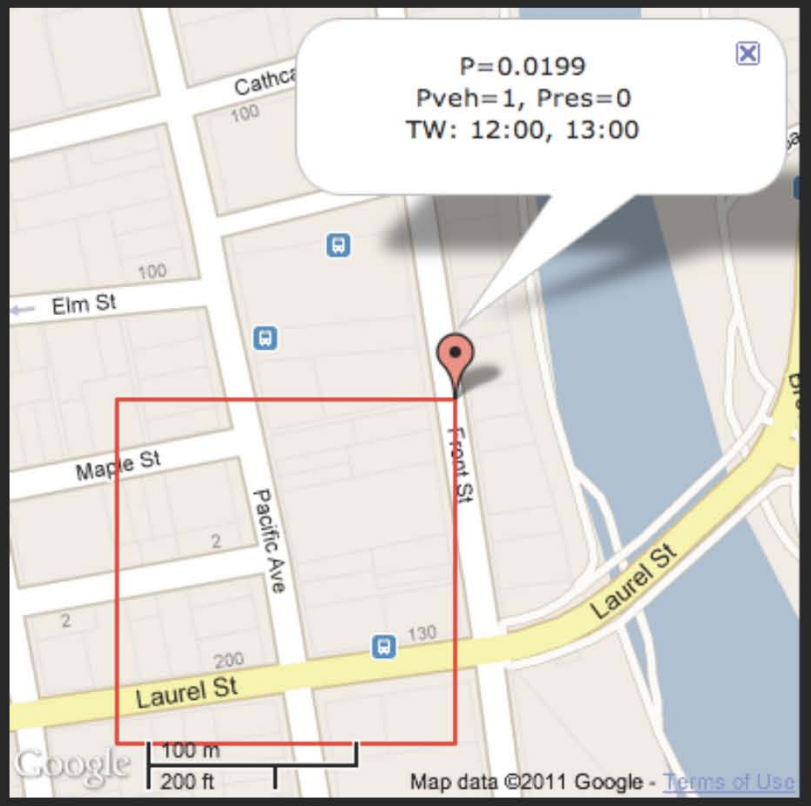
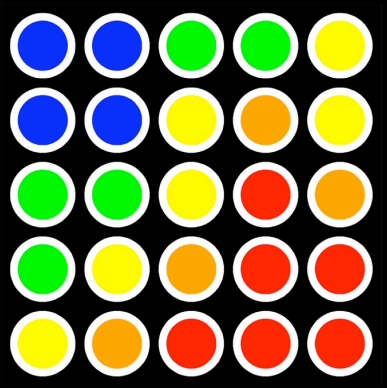




P is probability of one or more crimes in 24 hour time period
Pveh, Pres are conditional probabilities of vehicular and residential crime
TW gives start times of 2 highest risk 1-hour time windows

Goals of the project

- Patrol efficiency: quantitative approach to placing patrols where crime is located
- Reduction in crime rate in flagged areas
  Reduction in overall crime rate



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Mathematical and Simulation Modeling of Crime

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